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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/029,350	12/20/2001	Richard Roy Worthing JR.	13DV14197	5501
30952	7590	04/08/2004	EXAMINER	
HARTMAN AND HARTMAN, P.C. 552 EAST 700 NORTH VAIPARAISO, IN 46383			MORILLO, JANELLE COMBS	
			ART UNIT	PAPER NUMBER

1742

DATE MAILED: 04/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/029,350

Applicant(s)

WORTHING ET AL.

Examiner

Janelle Combs-Morillo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 January 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-14 and 16-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-6,8-14,16,17,19,20 is/are rejected.
- 7) ☒ Claim(s) 7 and 18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2, 4, 5 and 8-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lucas (US 3,607,398).

Lucas teaches a process for repairing gas turbine engine components such as blades (column 1 line 5, column 2 line 38) by removing a diffusion aluminide coating without attack of the substrate (abstract). Lucas teaches that the surface coating stripping method is applicable to improve the life of nickel and cobalt base superalloy components used in gas turbine engines (column 1 lines 2-6). Lucas teaches that said process is used when an aluminide coating is too thick, too thin, not uniform, or incomplete (column 1 lines 23-26). Lucas teaches removal of the unsuitable coating by a mixture of 10-80% nitric acid and 10-80% phosphoric acid, and teaches an example of a solution of 67vol% phosphoric acid and 33 vol% nitric acid, mixed with 20 weight% water (see column 1 lines 48-49, Table at bottom of column 1). Lucas teaches temperatures of 130-220°F (54-104°C, column 1 line 63) and times of typically 30-90 minutes depending on the initial coating thickness and coating removal desired (column 2 lines 60-66). After stripping, an aluminide coating is reapplied (column 1 line 30, column 2 line 41).

Lucas does not specify that said solution consists of “about 50 volume percent nitric acid and about 50 volume percent phosphoric acid”, substantially as presently claimed. Lucas teaches

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“stripping the aluminide coating from such base materials, by use of a concentrated mixture of phosphoric, nitric and acetic acids” (column 1 lines 38-40). However, Lucas also teaches that the rate of stripping depends on the temperature and proportions of said three acids, as is evidenced by Table 1 (column 1 lines 61-66, Table 1). Table 1 teaches that 83vol% phosphoric acid and 17vol% nitric acid achieve a “slow” strip rate, while 67% phosphoric acid and 33vol% nitric acid achieve a “fast” strip rate (that is, increasing the amount of nitric acid increases the stripping rate). Changes in temperature, concentrations, or other process conditions of an old process does not impart patentability unless the recited ranges are critical, i.e. they produce a new and unexpected result. However, said parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977), See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Because Lucas teaches that the nitric acid and phosphoric acid proportion is a result effective variable, i.e. increasing the amount of nitric acid (known to be a strong acid) increases the stripping rate, the optimum or workable ranges of said variable are characterized as routine experimentation.

Lucas does not mention a diffusion layer. However, Lucas teaches that said process does not attack the superalloy base material (column 2 lines 47-48), and that various degrees of stripping can be done to reduce the coating thickness, resulting in the repairing of only part of the component (column 2 lines 52-53, 61-65). Lucas teaches the removal of substantially all of the previously applied coating layer, for example, applying 0.0049 inch coating and removing 0.0042 inch (column 2 line 65). It would have been obvious to one of ordinary skill in the art to

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remove only the initial coating thickness (not the diffusion layer), by the application of nitric and phosphoric acids substantially as set forth above, because Lucas teaches said process does not attack the superalloy base material (column 2 lines 47-48).

Concerning claims 2, as stated above, Lucas teaches a solution of nitric acid, phosphoric acid, and water, substantially as presently claimed in instant claim 2.

Concerning instant claims 4 and 5, Lucas teaches various degrees of coating thickness can be removed, dependent on time and temperature of the acid solution. Lucas includes (see column 2 lines 65) an example of stripping aluminide coating for 25 minutes at 74°C (wherein 74°C is a close approximation of the presently claimed “about 75°C”).

Concerning instant claims 8 and 10, Lucas teaches a process is suitable for salvaging gas turbine engine components such as blades that have eroded coatings (column 1 line 5, column 2 line 38).

Concerning instant claims 9 and 11, Lucas teaches the application of initial coating with thickness 0.0039-0.0045 in, which overlaps the instant ranges.

Concerning instant claim 12, as stated above, Lucas teaches said process does not attack the superalloy base material (column 2 lines 47-48).

3. Claims 6, 13, 14, 16, 17, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lucas (US 3,607,398) as applied to claims above, in view of Das et al (US 6,174,448).

Concerning claim 13, as stated above, Lucas teaches said process is used when an aluminide coating is too thick, too thin, not uniform, or incomplete (column 1 lines 23-26). If the applied coating is too thick, then the process taught by Lucas for repairing turbine components

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would involve - a) applying an aluminide coating that is too thick, b) removing the aluminide coating (as set forth above, using nitric acid and phosphoric acid at temperatures and times within the instant limits), and c) reapplying an aluminide coating, while said process does not attack the superalloy base material (column 2 lines 47-48). Lucas teaches that the surface coating stripping method is applicable to improve the life of nickel and cobalt base superalloy components used in gas turbine engines (column 1 lines 2-6). Lucas does not teach the “too thick” layer is in excess of 100 μm , or the final layer is not greater than 100 μm .

However, Das teaches that aluminide coatings are typically 50-150 μm thick (column 3 lines 30-31). Therefore, it would have been within the level of one of ordinary skill in the art to apply a “too thick” layer is in excess of 100 μm , and a final layer is not greater than 100 μm , because Das teaches that aluminide coatings are typically 50-150 μm thick.

Concerning claim 14, Lucas teaches a solution of nitric acid, phosphoric acid, and water, substantially as presently claimed in instant claim 14.

Concerning instant claims 16 and 19, Lucas teaches various degrees of coating thickness can be removed, dependent on time and temperature of the acid solution (see column 2 lines 60-65). Lucas includes (see column 2 line 65) an example of stripping aluminide coating for 25 minutes at 74°C (wherein 74°C is a close approximation of the presently claimed “about 75°C”). Additionally, Lucas teaches the removal of substantially all of the previously applied coating layer, for example, applying 0.0049 in coating and removing 0.0042 in (column 2 line 65). Therefore, it is within the disclosure of Lucas to remove “substantially all of the additive layer” while not damaging the surface region of the component, substantially as presently claimed.

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Concerning claim 20, Das teaches aluminide coatings can be formed by chemical vapor deposition techniques (column 3 lines 32-33). It would have been obvious to one of ordinary skill in the art to form the aluminide layer taught by Lucas by a variety of methods, including vapor deposition, because Das teaches that said process is suitable for forming an aluminide coating on superalloy turbine parts (abstract).

Concerning claims 6 and 17, Lucas does not mention the deposit of a platinum layer following the removal step, and heat treating to diffuse the Pt layer. However, Das teaches that Pt aluminide coatings are well known in the art, and are formed by applying Pt to the substrate prior to (final) aluminizing to promote oxidation resistance (column 3 lines 18-25). It would have been obvious to one of ordinary skill in the art to apply a layer of Pt (as taught by Das) prior to final aluminizing in the process taught by Lucas, because Das teaches that said Pt layer to promotes oxidation resistance (Das at column 3 lines 18-25).

Allowable Subject Matter

4. Claims 7 and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicant's argument that the present invention is allowable over the prior art of record because the prior art does not teach said acid solution is capable of removing a platinum aluminide coating has been found persuasive (see arguments page 11).

Response to Arguments

5. In the response filed on January 8, 2004, applicant amended claims 1, 2, 13, and 14, canceled claims 3 and 15, and submitted various arguments traversing the rejections of record.

6. Applicant's argument that the present invention is allowable over the prior art of record because Lucas does not specify that said solution consists of "about 50 volume percent nitric acid and about 50 volume percent phosphoric acid", has not been found persuasive. As stated above, because Lucas teaches that the nitric acid and phosphoric acid proportion is a result effective variable, i.e. increasing the amount of nitric acid (known to be a strong acid) increases the stripping rate, the optimum or workable ranges of said variable are characterized as routine experimentation.

7. Applicant's argument that the present invention is allowable over the prior art of record because applicant's operable temperature range is more narrow than the operable temperature range taught by the prior art, has not been found persuasive. As stated above, Lucas clearly teaches substantially overlapping operable temperature ranges, and applicant has not clearly set forth specific unexpected results with respect to this overlap.

8. As stated above, applicant's argument that the present invention (instant claims 7 and 18) are allowable over the prior art of record because the prior art does not teach said acid solution is capable of removing a platinum aluminide coating has been found persuasive. However, concerning claims 6 and 17, the prior art does provide motivation for applying a Pt layer (as taught by Das) prior to final aluminizing in the process taught by Lucas, because Das teaches that said Pt layer to promotes oxidation resistance (Das at column 3 lines 18-25).

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Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Janelle Combs-Morillo whose telephone number is (571) 272-1240. The examiner can normally be reached on 8:30 am- 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Jcm
April 5, 2004



ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

